

ABSTRACT FOR GERMAN PATENT NO. 2,252,527:

Process for Determining Layer Thickness of Organic Methyl Compounds

The invention relates to a process for determining layer thickness of organic methyl compounds and an assembly for carrying out the process.

Layer thickness determinations have until now very often been performed using empirical processes. The layer thickness of transparent media may also be determined with the help of optical transmission.

All processes known until now have the disadvantage that they are incapable of producing highly precise values, above all at a speed fast enough for a control signal for optimization of complex events to be derived from them.

The invention is based on the task of developing a process, along with the relevant assembly for carrying out the process, by means of which film or layer thicknesses of organic methyl compounds such as for example methanol, acetone, toluol, xylol, cumol or acetophenone can be determined to within a few μm .

This task is solved by dividing the infrared laser beam, preferably of an He-Ne laser, into a measuring beam and a reference beam by means of a chopper assembly. The measuring beam meets the layer perpendicularly, and the reference beam meets an uncoated portion of the substrate perpendicularly, and both reflected beams are directed to a detector downstream from which there is an electronic unit for formation of a differential signal. By means of these measures it becomes possible, for example, to continuously measure the film thickness of the toluol color mixture on the form cylinder of printing machines and to thereby obtain a control signal for optimization of printing quality. The control signal is hereby obtained very quickly, which is a result of the use of laser light, the high beam intensity of which delivers a well-evaluable signal even for very thin layers.

It is suggested that for carrying out the process, a chopper setup and a plane mirror be assembled in the beam path of an IR laser and a semi-permeable mirror, a detector and an amplifier as well as an electronic evaluation unit be set up in the reflecting beams.

By means of this arrangement, it is possible to make use of the infrared absorption of the relevant methyl compounds for determining the film or layer thickness.

It has been shown in experiments that the methyl group CH_3 is strongly stimulated in the infrared energy realm of 2900 cm^{-1} (\cong approx. $3.4\text{ }\mu$); that is, pronounced absorption lines are seen at this place in the infrared spectrum. An He-Ne laser that emits a line at $3.39\text{ }\mu$ is suggested as the light source for the absorption measurements. By means of the special characteristic of laser light (strong bundling at high intensity), a very easy measuring setup is thereby made possible, which allows a layer thickness determination that is precise enough for technical purposes.

The invention is described and drawn below using an example of one embodiment. The single figure in the drawing shows the principle of this embodiment in a schematic representation.